

Taiga GOTO et al., S.N. 10/524,341
Page 6

Dkt. 1141/73790

Amendments to the Drawings

The replacement sheets of drawings attached hereto as **Exhibit A** include changes to, and replace, Figures 14A, 24, 27 and 30 of the original sheets of drawings.

The label for the ordinate in the graph shown in Fig. 15A has been changed from "N" to "Z".

The word "DETERMEN" in the label for step S4 in each of Figs. 24, 27 and 30 has been corrected to "DETERMINE".

It is noted that the indication in the Amendment filed November 5, 2007 that Figs. 15A, 16 and 30 were labeled as prior art was an inadvertent word processing error, and such indication is hereby stricken.

Attachment: replacement sheets of drawings for Figures 14A, 24, 27 and 30.

Taiga GOTO et al., S.N. 10/524,341
Page 7

Dkt. 1141/73790

REMARKS

The application has been reviewed in light of the Office Action dated July 3, 2008. Claims 1-14 were pending. By this Amendment, claims 2 and 10-14 have been canceled, without prejudice or disclaimer, claim 1 has been amended to include the features formerly recited in now-canceled claim 2, and claims 1 and 5-7 have been amended to clarify the claimed subject matter, without introducing new issues or new matter. Accordingly, entry of this Amendment is requested, and claims 1 and 3-9 would remain pending upon entry of this Amendment, with claim 1 being the sole remaining pending claim in independent form.

The drawings were objected to as purportedly having informalities. The specification was objected to as purportedly having informalities. Claim 13 was objected to as purportedly having informalities.

In response, the drawings and specification have been amended with particular attention to the points raised in the Office Action.

Withdrawal of the objection to the drawings and the objection to the specification is respectfully requested.

Claims 13 was objected to as having informalities. Claims 1-14 were rejected under 35 U.S.C. §112, first paragraph, as purportedly failing to comply with the written description requirement. Claims 1-14 were rejected under 35 U.S.C. §112, second paragraph, as purportedly indefinite.

In response, the claims have been amended with particular attention to the points raised in the Office Action.

Withdrawal of the rejections under 35 U.S.C. §112 and the objection to claim 13 is respectfully requested.

Taiga GOTO et al., S.N. 10/524,341
Page 8

Dkt. 1141/73790

Claims 1-3 were rejected under 35 U.S.C. §103(a) as purportedly unpatentable over Noo et al. ("Single-slice rebinning method for helical cone-beam CT", 1999, Phys. Med. Biol., Vol. 44, pages 561-570) in view of U.S. Patent No. 6,947,584 to Avila and U.S. Patent No. 6,097,784 to Tuy. Claims 1, 4 and 5 were rejected under 35 U.S.C. §103(a) as purportedly unpatentable over Hsieh '893 (US 2003/0073893 A1) in view of Avila. Claim 6 was rejected under 35 U.S.C. §103(a) as purportedly unpatentable over Hsieh '893 in view of Avila and further in view of U.S. Patent No. 6,490,333 (Hsieh '333). Claim 1-4 were rejected under 35 U.S.C. §103(a) as purportedly unpatentable over U.S. Patent No. 5,825,842 to Taguchi in view of Kudo et al. ("Three-Dimensional Helical-Scan Computed Tomography Using Cone-Beam Projections", 1992, Systems and Computers in Japan, Volume 23, Number 12, Pages 75-82).

Claims 10-12 and 14 were rejected under 35 U.S.C. §103(a) as purportedly unpatentable over U.S. Patent No. 5,796,803 to Flohr et al. in view of U.S. Patent No. 5,889,883 to Silver, and Bruder et al. ("Single-Slice Rebinning Reconstruction in Spiral Cone-Beam Computed Tomography", IEEE Transactions on Medical Imaging, September 2000, Vol. 10, No. 9, Pages 873-887) and Tuy. Claim 13 was rejected under 35 U.S.C. §103(a) as purportedly unpatentable over Flohr in view of Silver, Bruder and Tuy and further in view of Noo. Claims 10-14 were rejected under 35 U.S.C. §103(a) as purportedly unpatentable over Taguchi in view of Proksa et al. ("The n-PI-Method for Helical Cone-Beam CT", September 2000, IEEE Transactions on Medical Imaging, Volume 19, Number 9, Pages 848, 863).

By this Amendment, claims 10-14 have been canceled, without prejudice or disclaimer, in order to focus prosecution on the remaining claims. Applicant reserves the right to pursue claims 10-14 in one or more continuation applications.

Applicant respectfully submits that the present application is allowable over the cited art,

Taiga GOTO et al., S.N. 10/524,341
Page 9

Dkt. 1141/73790

for at least the reason that the cited art does not disclose or suggest the aspect of the present application that for each voxel, the projection data phase range is determined as an angle between 180 and 360 degrees (see paragraph [0096] of present application), ... so that the difference in the absolute values of cone angles at both ends of the projection data phase range used is reduced (see original claim 2 of application). Independent claim 1 of the present application addresses such aspect, as well as additional features.

Noo, as understood by applicant, proposes an approach for reconstructing an image in helical cone-beam CT, utilizing a CB-SSRB algorithm which is a combination of (a) single-slice rebinning of PET imaging and (b) weighting schemes of spiral CT. Noo proposes that a cross point of z-slice and helical orbit is set as a center of short-scan. In such situation, the absolute values of cone angles at both ends of a projection data phase range becomes equal, but in other situations, the absolute values do not necessarily become equal.

Noo simply does not disclose or suggest determining, for each voxel, a projection data phase range as an angle between 180 and 360 degrees ... so that the difference in the absolute values of cone angles at both ends of the projection data phase range used is reduced.

Taguchi, as understood by applicant, proposes an approach for performing x-ray computed tomographic imaging wherein backprojection data of a specified voxel within a region of overlap of cone-beam x-ray flux from the x-ray tube on the kth revolution with the cone-beam x-ray flux from the x-ray tube on the (k+1)th revolution are found using the projection data along the x-ray path through the specified voxel collected on the kth revolution and the projection data along the x-ray path through the specified voxel collected on the (k+1)th revolution.

In such approach, the two sets of projection data (that is different by one rotation) are added with weights in an area in which cone angles become almost equal. On the other hand, in

Taiga GOTO et al., S.N. 10/524,341
Page 10

Dkt. 1141/73790

other areas, a tomographic image is reconstructed using only data having a smaller cone angle. Stated another way, in Taguchi, it is assumed that the projection data phase range is equal to or larger than 360 degrees.

Taguchi simply does not disclose or suggest determining, for each voxel, a projection data phase range as an angle between 180 and 360 degrees ... so that the difference in the absolute values of cone angles at both ends of the projection data phase range used is reduced.

Kudo, as understood by applicant, proposes an approach for performing three-dimensional helical scan computed tomography using cone beam projections wherein the helical scan is based on continuous rotation of the X-ray source, a two-dimensional detector and translation of the object under examination.

Proksa, as understood by applicant, proposes an approach for performing helical cone beam computed tomography by utilizing a detector having a shape that is bounded by the helix.

However, Kudo and Proksa, like the other cited references (including Avila, Tuy, Hsieh '893, Hsieh '333, Flohr, Silver and Bruder which have already been discussed in the record), do not disclose or suggest the above-mentioned aspect of the present application.

Applicant submits that the cited art, even when considered along with common sense and common knowledge to one skilled in the art, does **NOT** render unpatentable the above-mentioned aspect of the present application of determining, for each voxel, a projection data phase range as an angle between 180 and 360 degrees ... so that the difference in the absolute values of cone angles at both ends of the projection data phase range used is reduced.

Accordingly, applicant respectfully submits that independent claim 1 and the claims depending therefrom are patentable over the cited art.

In view of the remarks hereinabove, Applicant submits that the application is now in

Taiga GOTO et al., S.N. 10/524,341
Page 11

Dkt. 1141/73790

condition for allowance. Accordingly, Applicant earnestly solicits the allowance of the application.

If a petition for an extension of time is required to make this response timely, this paper should be considered to be such a petition. The Patent Office is hereby authorized to charge any fees that are required in connection with this amendment and to credit any overpayment to our Deposit Account No. 03-3125.

If a telephone interview could advance the prosecution of this application, the Examiner is respectfully requested to call the undersigned attorney.

Respectfully submitted,



Paul Teng, Reg. No. 40,837
Attorney for Applicant
Cooper & Dunham LLP
Tel.: (212) 278-0400

RECEIVED
CENTRAL FAX CENTER
OCT 03 2008

EXHIBIT A

to
AMENDMENT
(Serial No. 10/524,341)